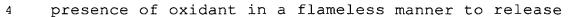
Claims

What is claimed is:

- 1. A keep-warm system for a fuel cell power plant (10), 1 comprising: a fuel cell stack assembly (CSA) (12) 4 including an anode (16), a cathode (18), an electrolyte (14), and a cooler (20); 5 fuel supply means (25) for providing a supply 6 of fuel, at least some of the fuel being supplied as reactant to the anode (16); 8 a source of oxidant reactant (22) operatively 9 c. 10 supplied to the cathode (18); a water management system (30, 28) 11 operatively connected to the cooler (20) of the CSA 12 (12);13 14 thermal insulating means (64) enclosing at least one of the CSA (12) and the water management 15 system (30, 28) for providing thermal insulation 16 thereof; and 17 f. catalytic fuel burner means (66) 18 19 operatively connected to the fuel supply means (25) and to the source of oxidant reactant (22) for 20 catalytically reacting the fuel and oxidant and 21 providing a source of heat, the burner means (66) 22 23 being disposed and operative to supply heated gas into the thermal insulating enclosure means (64), and to the 24 25 at least one of the CSA (12) and the water management system (30, 28) in the thermal insulating enclosure 26 means (64). 27
- 2. The keep-warm system of claim 1 wherein the
- 2 catalytic burner means (66) includes a catalytic
- surface (72) for combustively reacting the fuel in the



- 5 heat only in a thermal range less than about 1000° F.
- 3. The keep-warm system of claim 2 wherein the heat
- 2 released by catalytic combustion at the catalytic
- burner means (66) is in the thermal range of about
- 4 $200^{0}-700^{0}$ F.
- 1 4. The keep-warm system of claim 2 wherein the source
- of oxidant reactant (22) is ambient air, the air being
- 3 supplied to the catalytic burner means (66) and mixed
- with fuel from the fuel supply means (25) for
- 5 combustively reacting the mixture in the presence of
- the catalytic surface (72) to release heat.
- 5. The keep-warm system of claim 1 wherein the fuel
- supply means (25) comprises a container of hydrogen
- 3 stored under pressure.
- 1 6. The keep-warm system of claim 1 wherein both the CSA
- 2 (12) and the water management system (28, 30) are
- 3 substantially enclosed by the thermal insulating means
- 4 (64).

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- 7. The keep-warm system of claim 4 wherein the
- electrolyte (14) of the CSA (12) is a proton exchange
- membrane (PEM), the fuel from the fuel supply means
- 4 (25) is hydrogen, and the heat released by catalytic
- 5 combustion at the catalytic burner means (66) is in
- the thermal range of about $200^{\circ} 700^{\circ}$ F.
- 1 8. In a fuel cell power plant (10) having a fuel cell
- stack assembly (CSA) (12) including an anode (16), a
- cathode (18), an electrolyte (14), and a cooler (20), a
- fuel supply (25) for providing fuel to at least the

steps of:

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- anode (16), a source of oxidant reactant (22) for supplying at least the cathode (18), and a water management system (30, 28) operatively connected to the cooler (20) of the CSA (12), the method of preventing freezing of water in freeze-sensitive parts of the fuel cell power plant (10) during shutdown, comprising the
- a. selectively flowing (62, 63, 69, 67) fuel (25)
 and oxidant (22) to a catalytic fuel burner (66) during
 shutdown for catalytic combustion to provide heated
 gas;
 - b. convectively flowing the heated gas into heat transfer relation with the freeze-sensitive parts of the fuel cell power plant (10) to provide heat thereto; and
- 20 c. thermally insulating the freeze-sensitive 21 parts of the fuel cell power plant **(10)** including the 22 heated gas flowing in heat transfer relation therewith.